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VI.

Observations on a New Ring of the Planet Saturn.

By W. C. BOND,

DIRECTOR OF THE ASTRONOMICAL OBSERVATORY OF HARVARD COLLEGE.

(Communicated April 15, 1851.)

IN the remarks which follow, reference is made to the drawing accompanying this paper, which is lettered to correspond with the text.

“1850, November 11th, 7^h 30^m. M. S. T. Saturn is seen this evening under very good definition. We notice to-night with full certainty the filling up of light inside of the inner ring at *x* and *y*. Also, where the ring crosses the ball from *c* to *d*, or apparently below its projection, is a dark band, no doubt the shadow of the ring upon the ball; but what is very singular, there is also a dark line from *a* to *b*, or *above* the ring, very plainly seen, so that there can be no question as to the line where the upper edge of the ring crosses the ball. The light which fills the spaces at *x* and *y* is suddenly terminated on the side towards the ball. It does not arise from any optical deception, for this would give a similar appearance to the outside of the ring, or indeed to the edge of any object we look at, which certainly is not the case.

“G. P. B. is very confident of having seen to-night a second division of the ring, near the inner edge of the inner ring.”

“1850, November 15th, 7^h 30^m. The definition of the rings of Saturn is the best we have ever had. Employed powers from 140 to 400, the latter to advantage. The new ring is sharply defined on the edge next to the ball. W. C. B. thinks he sees the new ring clear of connection with the old. But the side next to the old ring is not so definite as that next to the planet, so that it is not certain whether the new ring is connected with the old or not. Where the dusky ring crosses Saturn, it appears a little wider at the outside of the ball than in the centre. Where it crosses the ball, it is not quite so dark as the shadow of the ring.”

“8^h. P. M. Cannot be sure of a division between the new and old rings (other than their difference of light). Once or twice with the higher powers one was suspected.

“On further examination we agree that the dark ring is narrower than the outer ring. Its inner edge may be as far from the inner edge of the broad ring as two thirds of the breadth of the outer ring.”

On the same evening the following notes were entered by Mr. C. W. Tuttle : —

“I notice a faint penumbral light on the inside of the interior (old) ring at its greatest apparent elongation from the ball as seen on previous nights. This light resembles that of the unilluminated part of the moon’s disc, as it appears for a few days preceding and following conjunction with the sun. Its estimated width is about the same as that of the outer ring, or a little less, and it appears the same on either side of the ball. The greatest width of this dark ring is at the same point on each side where the bright rings appear broadest. Where it crosses between us and the ball, it appears as a *dark* line on the disc close to the inside edge of the bright ring. The inner edge is sharply defined, but I cannot see that it is detached from the old ring.”

The appearances above described had been noticed on many occasions prior to the above dates, but their true explanation was first ascertained on the evening of November 15th. On that night an almost perfect tranquillity of the atmosphere afforded an invaluable opportunity of viewing the phenomena of the rings. The fact of the existence of a dusky ring hitherto unknown contained in the space between the old ring and the ball could no longer be questioned.

During the remainder of its apparition, Saturn was scrutinized on nearly every clear night, but up to the end of the year the state of the atmosphere was at no time equally fine with that on the 15th of November. The new ring was, however, always to be recognized when the definition was moderately good.

The concurring testimony of Messrs. Dawes and Lassell to the existence of this remarkable appendage to the old system of rings surrounding Saturn confirms the accuracy of our observations to their full extent. Whether or not the new ring is separated into two, as suggested by Mr. Dawes, or whether a division exists between it and the bright ring, its exact dimensions, &c. must remain as questions to be decided by future observations, for which, fortunately, the position of the planet is becoming every year more favorable.

In the engraving accompanying this paper, the outer ring is represented somewhat too narrow. As a consequence, the inner edge of the new ring should be brought nearer to the ball to preserve its correct proportion to the width of the outer ring. The width of the new ring being nearly two seconds of arc.